

REMARKS/ARGUMENTS

Claims 9, 16, and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Stark et al., WO 01/16493 A1, in view of Frenzl, U.S. Patent No. 3,823,872, further in view of Smith, U.S. Patent No. 5,697,361, and further in view of Zindl et al., U.S. Patent No. 6,899,198 B2. Reconsideration of the rejection is respectfully requested.

Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Stark et al. in view of Frenzl, further in view of Smith, and further in view of Zindl et al. Reconsideration of the rejection is respectfully requested.

Claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Stark et al. in view of Frenzl, further in view of Smith, and further in view of Zindl et al. Reconsideration of the rejection is respectfully requested.

Claim 12 was rejected under 35 U.S.C. §103(a) as being unpatentable over Stark et al. in view of Frenzl, further in view of Smith, and further in view of Zindl et al. Reconsideration of the rejection is respectfully requested.

The Examiner alleges, in connection with the rejection of independent claim 9, that element 125 is a porous diverging section used to reduce the level of noise, (Office Action, page 4, line 19). In justifying the combination of Smith with Stark et al. and Frenzl, the Examiner alleges that “element 125 is analogous to the porous diverging section 22 which is not taught having noise reducing characteristics,” (Office Action, page 5, lines 7-8).

However, element 125 is not a porous diverging section, contrary to the allegation of the Examiner. In fact, element 125 is taught by Smith to be “[a] cylindrical porous filter muffler,” (column 5, lines 47-48; emphasis supplied). A cylinder is not a diverging section but, in fact, is a section of uniform radius. The Examiner appears to assume that it would be obvious to one of ordinary skill in the art that since a cylindrical porous section can act as a filter muffler, a porous diverging section, as claimed in independent claim 9, can also act as a muffler. However, it is respectfully submitted that the noise reduction characteristics of a porous diverging section would not be obvious to one of ordinary skill in the art based upon the noise reduction characteristics of a cylindrical porous section.

In addition, the Examiner indicates, in connection with the rejection of independent claim 9, that, “Zindle teaches the limitations for varying the size of pores or interstitial spaces in a muffler material generally used to reduce sound generated by a jet pump 2 (Zindle et al. - col. 3

ll. 39-47). Further Zindle teaches that it was known in the art to vary size of said pores and space on the order of a nano range of sizes,” (Office Action, page 5, lines 18-22).

However, Zindl et al. teaches that, “[f]ine pores and pores in the nano range of size or interstitial spaces in such material [referring to the muffler body 18 of porous muffler material] render possible the passage of compressed air given a sufficiently high pressure gradient,” (column 3, lines 44-47; emphasis supplied). Thus, Zindl et al. only refers to pores in the nano range of size to render possible the passage of compressed air under high enough pressure. Zindl et al. does not appear to teach, disclose, or suggest the range of sizes of the holes in the second porous diverging section in a range of 50-500 μm “to provide relatively silent suction of the fluid without reducing the suction capacity,” as provided in independent claim 9.

Moreover, as the Examiner admits, Zindl et al. does not teach the claimed range of 50-500 μm for the holes in the porous diverging section, (see Office Action, page 7, lines 6-8). The Examiner, however, contends that such a range is merely an optimum or workable range and, therefore, can be discovered using only routine skill in the art, (see Office Action, page 7, lines 9-15).

The Examiner’s conclusion that the range of 50-500 μm for the hole size in the porous section is merely an optimum or workable range discoverable by using only routine skill in the art appears to ignore the requirement of the Manual of Examining Procedure (MPEP) providing that, “[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation,” (MPEP §2144.05, page 2100-152, left column, clause B, lines 1-5). Thus, the hole sizes of the porous diverging section claimed in independent claim 9 must be recognized to achieve the result of providing relatively silent suction of the fluid without reducing the suction capacity in order for the determination of the range of hole sizes claimed in claim 9 to be characterized as routine experimentation.

The Examiner has not alleged that Zindl et al. teaches the result of providing relatively silent suction of fluid without reducing the suction capacity, as claimed in claim 9. On the contrary, the only thing that Zindl et al. appears to teach is varying those hole sizes to allow the passage of compressed air. It does not appear that the Examiner’s conclusion that the range of 50-500 μm in hole size is merely an optimal or workable range discoverable through the use of

only routine skill in the art is correct since the Examiner has not shown that Zindl et al. recognizes hole sizes of a porous diverging section as achieving a result of providing relatively silent suction of a fluid without reducing suction capacity.

Since each of claims 10-12 and 16-17 is directly dependent upon independent claim 9, each of claims 10-12 and 16-17 is allowable for at least the same reasons recited above with respect to the allowability of independent claim 9.

Furthermore, with regard to the rejection of dependent claim 16, the Examiner alleges that, “Stark teaches that an improvement of the double-cone device 21 is that wear on the walls of the device is reduce [sic], however this is due to less turbulent flow (Stark - col. 2 ll. 28-20). Stark states that wall material is better able to resist wear resulting from fluid flow, therefore wall is still subject to fluid contact, the difference being that contact is less detrimental to the lifespan of the double-cone device 21 (Stark - col. 2 ll. 37-40),” (Office Action, page 7, line 22, to page 8, line 5). Applicant’s representative cannot find the exact citations mentioned by the Examiner to Stark et al. since the copy of Stark et al., WO 01/16493 A1, that Applicant’s representative has does not have columns and lines, but only pages and lines. However, Applicant’s representative assumes that the Examiner is referring to page 4, lines 20-26, of Stark et al. which state that, “[b]y moving this inlet plane 20 downstream of the orifice 19, as displayed in Fig. 2, and respecting the double-cone geometry, the wear problem is virtually eliminated. Experimentally, it appears that the inlet material 6 drawn into the double-cone device 21 is not subjected to such an extreme stress and so the wall material is better able to resist.”

The Examiner, apparently in attempting to meet the provisions of claim 16 that the continuous geometry of the device is configured to cause the flow profiles of the fluid to remain in contact with the wall of the neck, with the wall of the second porous diverging section, and with the wall of the third diverging section, alleges that Stark et al. teaches that the wall is subject to fluid contact. However, claim 16 is dependent on claim 9. In support of the rejection of claim 9, the Examiner, in justifying the obviousness of modifying the cone of Stark et al., by replacing the cone’s orifice forming a neck and a diverging section comprising a solid continuous wall with a porous diverging section, taught by Frenzl, indicates that this modification to the cone of Stark et al. is “in order to eliminate or reduce a fluid boundary layer on the inner wall of the diverging section in series with a converging section of the double cone in order to increase a double cone’s efficiency (Frenzl - col. 2 ll. 56-64),” (Office Action, page 4, lines 12-15).

It appears to be true, as the Examiner states, that Frenzl teaches this porous diverging section to allow the elimination or reduction of a fluid boundary layer on the inner wall of the diverging section. The porous diverging section 21 accomplishes this by allowing superheated steam to pass through its pores into zone 22 of the diverging cone to form a layer of steam moving along the wall of the nozzle into the remaining portions of diverging cone 20. This film of steam minimizes the tendency of water striking the nozzle walls to form a liquid boundary layer in the diverging portions of the nozzle, (see Frenzl, column 5, lines 29-57).

It appears that the Examiner's rejection of claim 16 does not meet the provisions of claim 16. In order to make this rejection, he includes Frenzl in the combination of references supporting the rejection. However, Frenzl teaches the elimination or reduction of a fluid boundary layer on the inner wall of the diverging section. In contrast, claim 16 requires the flow profiles of the fluid in the second porous diverging section and in the third diverging section to remain in contact with the wall of the second porous diverging section, and with the wall of the third diverging section. Moreover, the Examiner's rejection relies on the teaching of Frenzl of the elimination or reduction of a fluid boundary layer on the inner wall of a diverging section of a nozzle and the teaching of Stark et al. that the fluid remains in contact with the wall of a double-cone device, which appears to contradict the teaching of Frenzl.

Moreover, with regard to the rejection of dependent claim 17, the Examiner alleges that, "Smith teaches that a filter coupled to the neck of a jet pump, analogous to the double cone devices of Stark and Frenzl, reduces sound during operation (Smith col. 25-30)," (Office Action, page 8, lines 7-9). Fig. 7 of Smith shows a jet venturi induction pump 111. "The jet venturi induction pump is connected with the outlet of the air pump via inlet coupling 123. Breathable air from the air pump enters the jet venturi induction pump through the nozzle entrance area 113. At region 114 the breathable air from the air pump converges at the throat of the venturi nozzle 115, wherein the air pump air velocity is maximized. The high velocity causes below ambient pressure air to exit at 116 and which is called the free jet area. The region 116 may also be described as a low pressure field. At this point, external breathable ambient air received at one atmosphere pressure flows to the low pressure field region 116 through the induction duct ports 117. A cylindrical sleeve 121 may be used to cover all or a portion of the induction duct ports. In FIG. 7 the sleeve is in a position which leaves the induction duct ports uncovered. A cylindrical porous filter muffler 125 is attached to the cylindrical sleeve and covers the portion of

the induction duct ports which are not covered by the sleeve 121,” (Smith, column 5, lines 32-50).

The filter muffler 125, on one hand, is used to filter air entering the pump. On the other hand, it is used to prevent noise, which has been generated at the nozzle 115, from leaving the pump 111 through the induction duct ports 117. In contrast, claim 17 provides that the continuous geometry of the double-cone device is configured to reduce noise levels during operation of the device, and the Examiner has not shown that Smith or any of the other applied references disclose or teach this.

Furthermore, the Examiner alleges that, “Zindle teaches that the level of noise reduction can be improve [sic] by varying the size of pores or interstitial [sic] spaces within muffling material 18 analogous to the filter 125 of Smith (Zindle col. 3 ll. 39-47),” (Office Action, page 8, lines 9-11). However, Applicant respectfully disagrees that Zindl et al. teaches that the level of noise reduction can be improved by varying the size of pores or interstitial spaces. As previously pointed out, the cited portion of Zindl et al. only teaches varying the size of the pores or interstitial spaces to render possible the passage of compressed air and says nothing about varying those sizes to improve the level of noise reduction.

In view of the foregoing remarks, allowance of claims 9-12 and 16-17 is respectfully requested, claims 1-8 and 13-15 having been withdrawn from consideration.

Respectfully submitted,

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